

**AN OVERVIEW - NASA LERC STRUCTURES PROGRAM**

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by

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## **LERC STRUCTURES AND ACOUSTICS DIVISION CAPABILITY**

The Structures and Acoustics Division of the NASA Lewis Research Center has its genesis dating back to 1943. It has been an independent Division at Lewis since 1979. Its two primary capabilities are performance and life analysis of static and dynamic systems such as those found in aircraft and spacecraft propulsion systems and experimental verification of these analyses. Research is conducted in-house, through university grants and contracts, and through cooperative programs with industry. Our work directly supports NASA's Advanced Subsonic Technology (AST), Smart Green Engine, Fast Quiet Engine, High-Temperature Materials and Processing (HiTEMP), Hybrid Hypersonic Propulsion, Rotorcraft, High-Speed Research (HSR), and Aviation Safety Program (AvSP).

### **LeRC Structures & Acoustics Division Two Primary Capabilities**

- Analysis capability
- Experimental capability

## **LERC STRUCTURES AND ACOUSTICS DIVISION CORE COMPETENCIES**

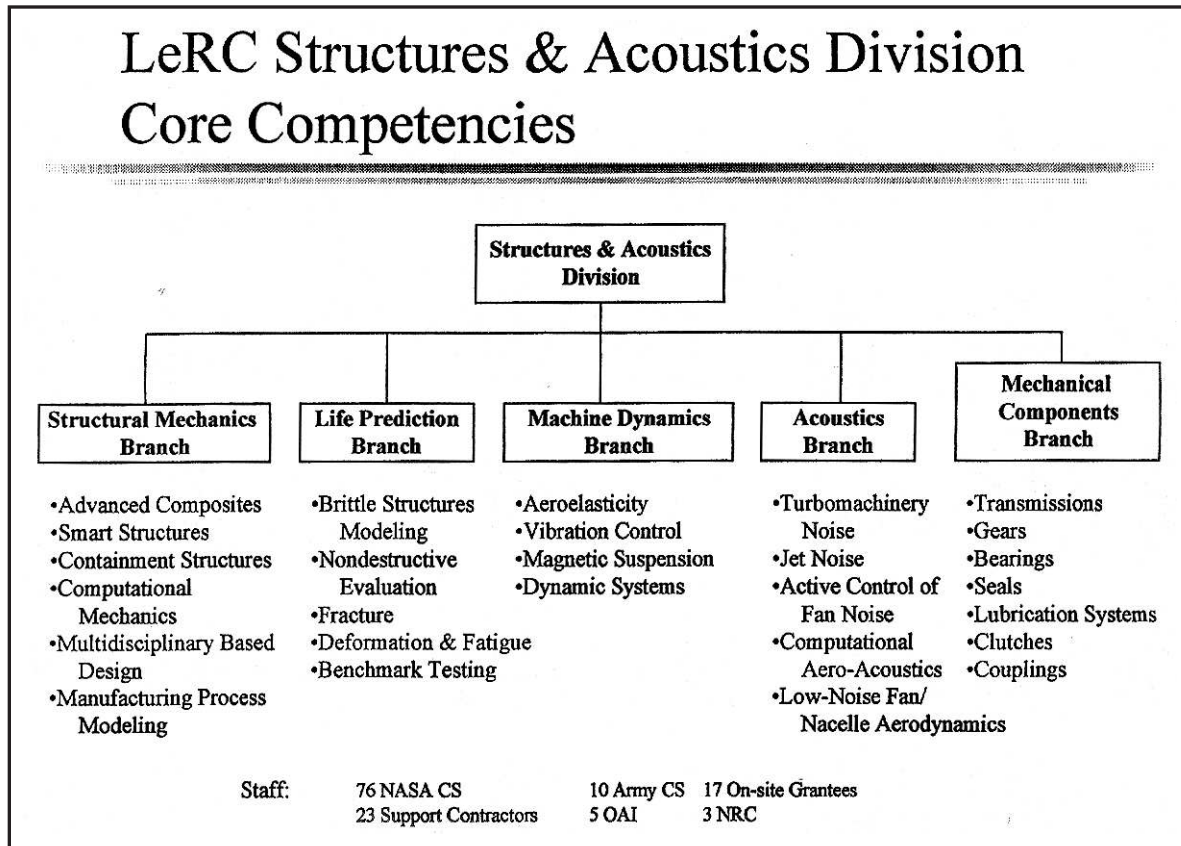
There are eight core competencies of the Structures and Acoustics Division. These are listed below. A primary focus of the Division has been the design and application of new composite materials into advanced aerospace structures. In addition, research is being performed on drive systems for helicopters and turboprop aircraft. Work is performed on aeroelasticity and aircraft engine noise suppression. Current goals emphasize lighterweight, more reliable aeropropulsion structures operating at higher temperatures.

### **LeRC Structures & Acoustics Division Core Competencies**

- Computational tools
- Experimental methods and test techniques
- Structural concepts
- Advanced materials applications
- Mechanical drive systems
- Vibration control
- Aeroelastic codes
- Noise Suppression

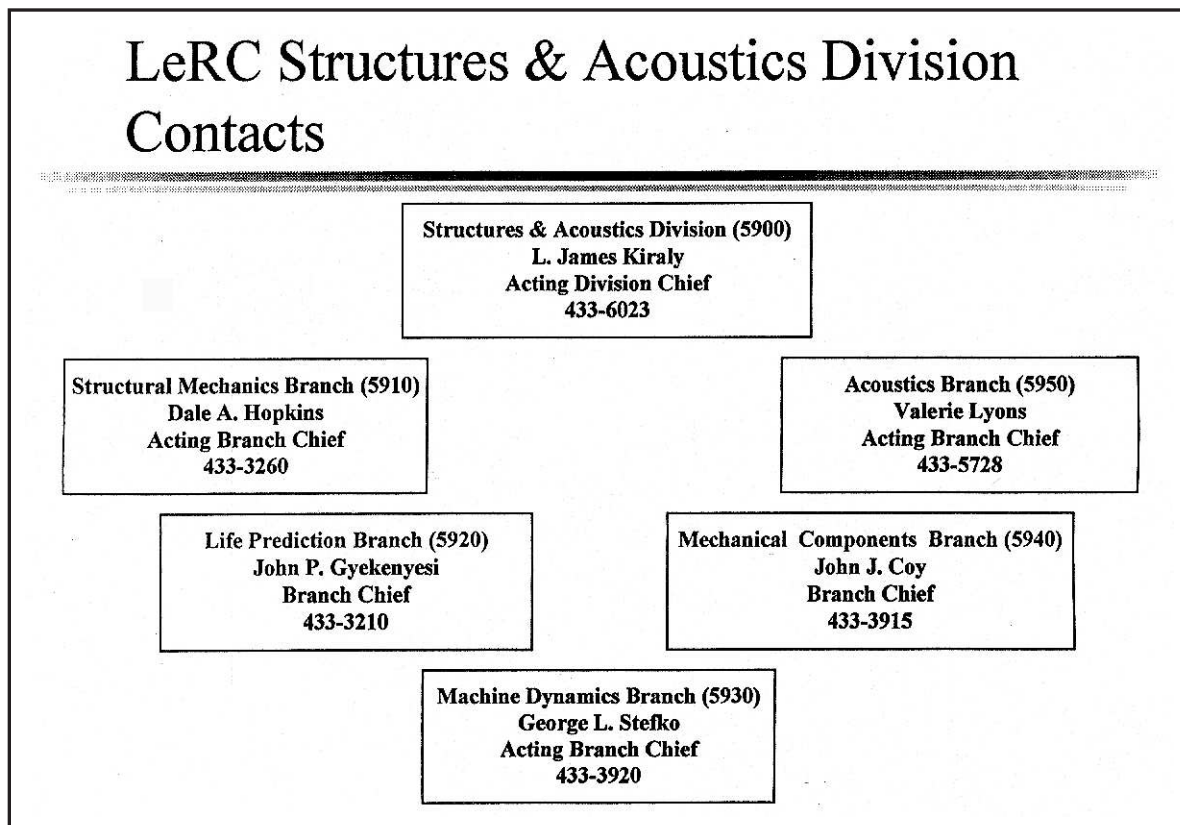
## LERC STRUCTURES AND ACOUSTICS DIVISION ORGANIZATION

The Structures and Acoustics Division comprises five branches consisting of 134 engineers, scientists and support personnel. The staff consists of NASA Lewis civil servants and personnel from universities and private support organizations which are listed. The breakdown of the Division programs are shown under their respective branches.



## LERC STRUCTURES AND ACOUSTICS DIVISION CONTACTS

The Structures and Acoustics Division welcomes inquiries from industry, universities and other government organizations as well as private individuals. There exists many collaborative research and technology projects between outside organizations and the various branches. Contacts for each of the organizational entities are shown.



## TEST AND EVALUATION

Unique mechanical testing and nondestructive evaluation techniques are being developed to make global civil aviation and access to space more competitive and affordable. A state-of-the-art computed tomography facility was developed to characterize critical manufacturing problems in advanced composite materials and engine subscale components. This facility provides rapid re-engineering and reduction in product development cycle time. A world-class benchmark testing facility for high temperature structures was established. This facility is used to verify and validate structural analyses methods for aeropropulsion systems operating at 1500°C and to produce reliable test data for advanced materials in scale-up form subjected to prototypical operating conditions. The ballistic impact facility was built for testing light weight fan containment systems and other jet engine systems where impact strength is of concern. High temperature compliant engine seals are being developed to survive temperatures up to 1100°C, to have low leakage, to exhibit resilience with cycling, and to resist scrubbing damage.

